

REMARKS/ARGUMENTS

The present application includes claims 1-3 and 5-20. The Office Action rejected claims 1-3 and 5-20 under 35 U.S.C. §103(a) over Jensen et al (US 6,666,579) (“Jensen”) in view of Barth et al (US 2003/0052879) (“Barth”).

Claim Rejections – 35 U.S.C. § 103

The Office Action rejected claims 1-3 and 5-20 under 35 U.S.C. §103(a) over Jensen in view of Barth.

Turning to independent claim 1, the Office Action alleges that Jensen discloses instrument tracking on a computer and quotes a limitation of claim “automatically displaying on an output device each image and projecting the position and orientation of the instrument onto each image” and cites to col. 10, lines 25-49 of Jensen for support. The Office Action further states that Jensen discloses 3D rendering of the patient data with the instrument superimposed. However, in Jensen, unlike the recited claims in the instant application, the 3D patient data in Jensen is constructed “using any one of several algorithms known for constructing three-dimensional data volumes based upon exposures obtained from a cone beam source.” *See* Jensen, col 12 lines 27-43.

Further, in Jensen, the display graphics processor 295 constructs graphical representations of the instrument, while in the present claim 1, the position and orientation of the instrument is projected onto each image. Therefore, Jensen does not teach projecting on the image the 3D information of the orientation and position of the instrument but rather Jensen creates a graphical representation.

Further, Applicants respectfully submits, and the Office Action admits, that Jensen does not teach, suggest or disclose the technology of displaying the static 2D images in sequential

image by image manner to create 3D information perceived by a user by creating motion through the animation process. Applicant respectfully submits that Jensen does not teach suggest or disclose the feature in the presently amended claim 1 of automatically displaying on an output device each image in said collected plurality of static 2D images in a continuous sequential image by image manner to create creating 3D information perceived by a user of said position and orientation of said instrument, wherein said user perceived 3D information is created by said continuous sequential image by image motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image.

Further, Barth does not cure the deficiencies of Jensen. Nowhere does Barth teach, disclose or suggest animation of 2D static images to create 3D information of the instrument's position and/or orientation. Applicant submits that Barth also fails to specifically teach this admitted shortcoming of Jensen.

The Office Action alleges that Barth discloses mixing volumes of interest into 2D central projections and successively viewing the 2D central projections with marks such as by scrolling or in the form of a cine display in the fashion of a movie and cites to paragraph 0041 of Barth in support stating that this reads on displaying the static 2D images in a sequential image by image manner to create 3D information by creating motion through the animation process. Applicants respectfully disagree.

Unlike the technology in the present amended claim 1, Applicants respectfully submit that Barth does not disclose, teach or suggest automatically displaying on an output device each image in said collected plurality of static 2D images in a continuous sequential image by image manner to create creating 3D information perceived by a user of said position and orientation of said instrument, wherein said user perceived 3D information is created by said continuous

sequential image by image motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image.

Barth does not use animation to create 3D information. Animation is defined as “the act, process or result of importing . . . motion.” (American Heritage Dictionary, 3d ed.) Rather, in Barth, the 3D image data is reconstructed using algorithms. See paragraph 0005 defining “reconstructive imaging”. *See also* paragraph 0038. “They are taken into consideration not only in the reconstruction algorithm in the determination of 3D image data but also in the selection of the VOI.”

Further, in Barth, the 2D central projections containing the marks are presented on the monitor as a cine replay. This is so the user can easily see whether the respective region of interest of the examination subject is located in one of the 2D central projections outside of the volume of interest. If this is the case, then the user can switch back to the selection mode and correct the selection of the volume of interest. Barth, para. 0132. Nowhere does Barth disclose using the natural human ability to perceive 3D information from animated 2D data to transfer the position and/or orientation of a surgical instrument to a user. As shown above, Barth discloses reconstructing 3D image data using algorithms.

Thus, neither Jensen, as admitted by the Office Action, nor Barth disclose the recited feature of automatically displaying on an output device each image in said collected plurality of static 2D images in a continuous sequential image by image manner to create creating 3D information perceived by a user of said position and orientation of said instrument, wherein said user perceived 3D information is created by said continuous sequential image by image motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image.

Further, Applicants respectfully submit that the combination of Jensen and Barth would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. As stated in the Application “Previous designs have used static, non-animated data to accomplish transfer [of the position and/or orientation of a surgical instrument to the user] in a method that requires substantial learned skill.” Applicants submit that animating 2D data so that the human may perceive 3D information of a surgical instrument is not obvious as all previous designs have used static non-animated data to accomplish the task.

For at least the reasons stated above, Applicants submit that neither Jensen nor Barth, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of amended claim 1. Applicants respectfully submit that currently amended independent claim 1 is in condition for allowance.

Claims 2-3 and 5-9 ultimately depend from claim 1 and should be allowable at least for the reasons stated.

Turning next to independent claim 10, the Office Action alleges that “[c]laim 10 is similarly analyzed to the above claims. Note that Barth discloses selects the volume of interest in each image, and it is displayed, and this is repeated for each image.” Office Action, page 5.

As presented above, nowhere does Barth teach, suggest or disclose automatically repeating said selecting, computing, projecting, and displaying steps to create 3D information of said position and orientation of said instrument by creating motion through the animation process using a sequential image by image presentation through said series of 2D static images as claimed in claim 10 of the instant application. .

Further, Applicants respectfully submit that the combination of Jensen and Barth would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention.

Thus, for at least these reasons, Applicants submit that neither Jensen nor Barth, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of claim 10. Applicant respectfully submits that currently amended independent claim 10 is in condition for allowance.

Claims 11-17 ultimately depend from claim 10 and should be allowable at least for the reasons stated.

Regarding independent claim 18, the Office Action alleges simply that independent claim 18 is analyzed similarly to claim 1. Applicants respectfully point out that, as presented above, neither Jensen nor Barth teach, disclose or suggest creating 3D information perceived by a user by creating motion through the animation process by automatically and continuously presenting an image by image animation of said series of static images including at least one of a position and orientation of at least one instrument and at least one image of said at least one instrument located at said at least one of a position and orientation.

Claims 19-20 ultimately depend from claim 18 and should be allowable at least for the reasons stated.

As claims stand amended, Applicants respectfully submit, that Jensen does not teach the claimed features of independent claims 1, 10, and 18. Further, the Applicants respectfully submit, for at least the reasons stated above, the combination of Jensen and Barth would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention.

CONCLUSION

In general, the Office Action makes various statements regarding the pending claims and the cited references that are now moot in light of the above. Thus, the Applicants will not address such statements at the present time. However, the Applicants expressly reserve the right to challenge such statements in the future should the need arise (e.g., if such statement should become relevant by appearing in a rejection of any current or future claim).

In view of the above remarks, Applicants respectfully submit that claims 1-3 and 5-20 now pending in the application contain patentably distinct subject matter over all the references of record and are in condition for allowance. Applicants, therefore respectfully request consideration of the pending claims and a finding of their allowability. A notice to this effect is respectfully requested. Please feel free to contact the undersigned should any questions arise with respect to this case that may be addressed by telephone.

The Commissioner is authorized to charge any additional fees or credit overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

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/Dennis P. Hackett/

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